I hereby certify that this correspondence (including Exhibits) is being deposited with the United States Postal Service via Express Mail in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on August 15, 2006 (Express Mail Label No.: ET615079096US).



Natu J. Patel

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of C. Earl Woolfork

Serial No. 10/648,012 : Group Art Unit: 2615

Confirm. No.: 3337 : Examiner: Andrew C. Flanders

Filed: August 26, 2003

For: WIRELESS DIGITAL AUDIO MUSIC SYSTEM

DECLARATION OF APPLICANT UNDER 35 USC Section 132

I, C. Earl Woolfork, being duly sworn, depose and declare as follows:

- 1. I am the Inventor of the above referenced patent application ("Application"). I have personal knowledge of the following matter and if asked to testify, could and would testify competently, thereto.
- 2. Daphne Burton, my then attorney, conducted the interview with Examiner Flanders and Supervisory Patent Examiner Tran (collectively "Examiners") on June 13, 2006 regarding the pending office action dated May 17, 2006 ("Office Action"). I participated in that interview.
- 3. During the interview, among other things, page 6 of the Office Action was discussed, which states that, "A frequency shift keying (FSK) modulation/detection technique could be used given a frequency hopping spread spectrum (FHSS) system choice. The terms and techniques discussed in this sentence (FSK and FHSS) were not present in the parent disclosure nor in the current application's disclosure and thus are new matter."
- 4. During the interview, I explained to the Examiners that that FSK is an inherent feature of FHSS and that FHSS and direct sequence spread spectrum ("DSSS") are two inherent features of CDMA. In response to the discussion, Examiners requested that I submit evidence through an affidavit under 35 USC Section 132 providing substantiation.

Docket No.: <u>W003-4000</u> <u>PATENT</u>

5. I am hereby submitting this affidavit together with the supporting documentation for consideration and respectfully requesting that the new matter rejection relating to this particular issue be withdrawn.

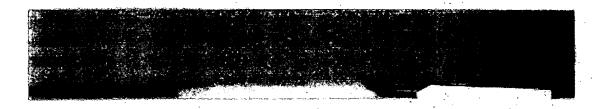
- 6. Paragraph 0016, lines 14 16 of the Parent Application 10/027,391, recites in part that, "This code division multiple access technique (CDMA) may be used to provide each user independent operation."
- 7. Relevant pages from the well known text book entitled, "Spread Spectrum Systems with Commercial Applications," by Robert C. Dixon, Third Edition, are attached herewith as Exhibit A. Here are the <u>relevant excerpts</u> from Exhibit A:
- a. "CDMA, or code-division multiple access systems, use codes to separate one signal from another . . . Either direct sequence or frequency hopping systems can employ CDMA,..." (Refer to Page 2 of Exhibit A)
- b. "For some reason which is not obvious, it is often assumed that CDMA and direct sequence methods are synonymous. Our discussion of CDMA in the previous section certainly applies to direct sequence (notice that the words "direct sequence" were never used) but also may be applied to frequency hopping." (Refer to Page 3 of Exhibit A)
- c. "Frequency hopping modulation is more accurately termed multiple frequency, code selected, frequency shift keying. It is nothing more than FSK (frequency shift keying) except that the set of frequency choices is greatly expanded." (Refer to Page 4 of Exhibit A).
- 8. Based the above, it is apparent to one skilled in the art that FSK is an inherent feature of FHSS, and FHSS is one of the two inherent features of CDMA (the other inherent feature is DSSS).

Date: 8/14/010

Respectfully Submitted,

By: C. Earl Woolfork

EXHIBIT A



04 MILLTIFLE ACCUSS, SNAIF OIL AND PARTY TALES

very algorithment property of TDMA is that useds can operate together in a TDMA mitte with no operator problem at all.

Translation of displacementaries TDMA is also a practical technique, and is the basis for "digital collular" section. Insuch systems, much of the overload expired is not taken up by actual transmission of dam, however, instead, to precent signals that are transmissed by multiple overs at surging dictances from a receiver, from a range of a the same time, a guard same is added to each time alor.

In could ce'b, guard time may be insignificant, but in large sells, guard time may actually take up more time than is elloted for data transmission. Since radio signab propagate at approximately six microscoreds per calle, any distance uncertainty in the position of a transmitter with respect to a receiver must appear in the guard time allowance in every time stot. Time slot size and guard time ore both very important, at larger time stars mann fewer guard times, but processing feltry may be looper.

With the 197.9 mass we previously postulated, let us consider an example:

- Suppose each Schips user has 100 time slots per second. He mess extramin his data in 30-bit increments, with eight bits of overhead.
- There are 19,750 time slots per second available, each with period 50,5505 microseconds.
- Data is transmitted in 38-bit chunks, at a rate of 1.721523 megabits per second: Thus 4th microseconds per time status left for guard these and this in turn allows expressionally a 0.75-mile range unvertainty.
- If longer time stars are used, with fewer per user, langer guard time and therefore larger cells each! he accomposited.

This example is intended energy to show the relationships involved in TDMA systems (single tree per carries).

Code Division Multiple Acress

CDMA, or ende-Christen militate access systems, uso codes to separate consignal from against class we have mischinely discussed in Chapter 13. Eather client acquesce or frequency happing systems can employ CDMA, so we will common both methods to FDMA and TDMA approaches.

CDMA systems are dependent on the design of codes that are "onlogued" to one another, at least within the set of endes employed in a nativork. Orthogonative in this operant menes stones that all of the orders excellents have for enough emotival cross-correlation that they do not significantly interfere with one another over the dynamic stone of the stynals remembed to any receiver in a CDMA retwerk. This is the parable of the Gold codes, Kesami eddes, and bear codes discussed in Chapter 3. Unfortunately, there is no known set of ordes that is esimpletely orthogonal when used in the

VER T

conditions. Our exist on a necess system with a large a under these conditions is that why as additive white Gaussi to add no more interference power lavel. If the coder as same time, then the finite on because a receiver will work signatic does not except the laminary margin. Therefore, if fell users signals are edged. Jamming margin in a dize

RF band

In a I-MHz benewich will mately

10 AU - 8 KB)

and the chasimum rumber server, each of which meets. 126.

Improvements might be processing gainst redecing in locate.

In frequency happing, the receiver's januaring margin, frequencies interfered with,

in the ISM bonds, at I 500 MHz band, and IS free to 20% of these frequencies number of users possible we

50/3 = 1

*More (D) e (D) still skomfr som serjug sgad Kinkrys, etc. *TEB is ar commit quilcisis ec som secretion, and the er such 177 er 4 Kips). With the such is TOMA meet world in the 1948, entimes CDMA would lick mid-Coffeet by upor commit dispuse.



412 MULTIPLE ACCESS ASSAUCH ONL AND FAIRY VALES

If we compare time Chiskin CDMA to power-control CDMA, in multipler networks (for example; a network with a single best station and many medically distributed users scattered proceed (1), it is easy to see that:

The time division base station requires only one transmitter and one receiver to service diffits associated them. (This includes any signal protessing that is to be done.) The passer-courted base station, on the other hand, requires a separate transmit channel? and a separate receive channel for every user. This means that a power-consist system with 32 users would require X2 transmit channels and 32 receive channels, while the time chasin system requires only one.

If more were are necommodated, by eather reducing data rate, or bysemecing a base station's expense, then the number of transmitters and resolvers stripply goes up by by the same amount as the transmitters and increasing processing gala, and thereby language marginy number of esers, by reducing data fare would allow

Data Rain		 Zemming Margin			Number of Units		
8 Keps 4 Klips		18.9 db 189 db			39 .25 39.5		
2 Kbps		21:0 dB		*-	12.2		

From this we see the value of reducing the data rate in a spread spectrum system. We note, however, that reducing the data rate in non-spread-spectrum systems can produce similar results. (We will see in exchapts of this in the specceding paper).)

Incomptons Note:

It is of no use whenever to consider the number of their possible in a spread spectrum system to be \$0. 100, or any other number unless the endes employed beamenther than we are discussing each distinguished every the entry of the end of the

Prequency Hopping and COMA-



For some recent which is not obvious, it is after assumed that CDMA and maken sequence enchous are symmetrical. Our discussion of CDMA in the pressure sequence remainly applies to fire exercise brough that the words "direct sequence" were never used four also may be upplied to frequency battoling.

*A single grown amplaire and a single received the half town operator on the first, but expands processing, and abulation and demodification is with more of the reserving features each their appropriate and an additional contribution of the standard feature. of one has two or more to move the first that the collection multiple is matter that come mistake only direct requests with pre-

How many users are print users is a function of the re that we have a 1.25-MHz RF rate 1/2 rending 1192-K by correctation. We will also use 1/2. (This is MSK machinic

Dandwidth per channel

Number of characts availfairming MARGIN (bros-

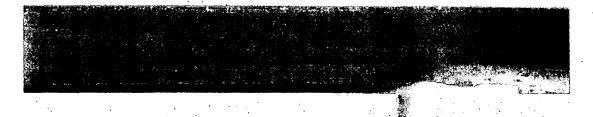
SI

Jamming Margin (orber er

Chis assumes for channels for immed channel products in

In military systems, it is respect to every other user, many channels available use time each over with respective each controlly uses the same remained interfere with one support up to \$32 users to t

Commercial users are a hupped channels or to combinate offsetting of code sequents every channel in the han approach is effectively the sactional being used, laterle-greatly increased.



33 SPECAD SPECTROM TECHNIQUES

some advantages. The other farms of direct pequence modulation cannot repich. We haven to state that there are many forms of MSR modulation, each with different spectrum and characteristics. Offset OPSR is, in fact, one famo of MSR modulation. We will further discess these forms and compare their characteristics in detail in Chapter 4.

2.2 FREQUENCY HOPPING!

Frequency bapping" modulation is more accuracly termed "multiple-frequency bappings" modulation is more accuracly termed "multiple-frequency bappings of the frequency that begins except that the set of frequency choice is greatly expanded. Sample FSR anost offerings only can frequency choice is constituted for the senit of sample for the senit of senit of mark. It is senit a "space." Trequency bappers, on the other hand, often have thousands of trequencies available. One real system to be able to deep the senit of the subset of a code in combination with the information transmitted frequency to trequency of the subset of trequency bapper is governed by the recalirements placed on a for a particular use.

Characteristics of Frequency Hopping Sands

A frequency happing system or firmuckey hopper consists basically of a code generator and a frequency synthesizer capable of responding to the ended output from the code generator. A great deal of effect has been expossible in developing rapid-response frequency synthesizers for spread spectrum systems.

Ideally, the instantaneous frequency honger output is a single frequency. Practically, however, the system user must be satisfied with an output spectrum which is a exemposite of the desired frequencies, sidebands generated by hopping, and spurious frequencies generated by hopping, and spurious frequencies generated as by products.

Figure 2.12 is a surplified olock diagram of a frequency hopping transmission system. The frequency spacerum of this frequency happen is shown in Figure 2.13.

Over a period of time, the edeal frequency hunging spectrum would be perfectly remarkable, with unexplishers distributed eventy in every available frequency channel. The transmitter should also be designed to transmit to a degree as close as practical, the some around of power in every channel.

The received frequency hopping signal is which a family contained sephen, which is office a fixed amount such that $\{f_1, f_2, \dots, f_d\} \times \{f_1 + f_{10}, f_1 + f_{11}, \dots, f_d = f_{10}\}$ produces a constant difference frequency f_0 when transmitter and traches code secuences are in symbochism.

*See the Bibliography Sections 1, 7, so 23

